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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/853,083	05/10/2001	Kenji Uchiyama	9319S-000204	5266

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EXAMINER

RUDE, TIMOTHY L

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 09/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

09/853,083

Applicant(s)

UCHIYAMA, KENJI

Examin r

Timothy L Rude

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5-14 and 16-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5-14 and 16-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claims 1, 9, 12, 24, and 25 are amended.

Claims 1 and 9 are objected to because of the following informalities: The recitation "superimposed over" did not appear in the original presentation of the claims, and "superimposed over" is not defined or supported in the Specification. For examination purposes, "superimposed over" will be interpreted as -- aligned with --. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3, 5-14, and 16-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al (Takahashi) USPAT 6,266,119 in view of Ishikawa et al (Ishikawa) USPAT 5,258,866.

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As to claims 1, 9, 11, 12, and 13, Takahashi discloses a method of manufacturing a liquid crystal apparatus (Applicant's electro-optical device) using substrate alignment marks, A1, A2, spaced approximately equal to the spacing of driver board (Applicant's mount base member) alignment marks B1, and B2, (Figure 6) (Applicant's plurality of second alignment marks being arranged at a spacing approximately equal to a spacing of the plurality of first alignment marks) to accurately align one set of terminals on said substrate with another opposing set of terminals on the driver board flexible film to facilitate thermal compression bonding.

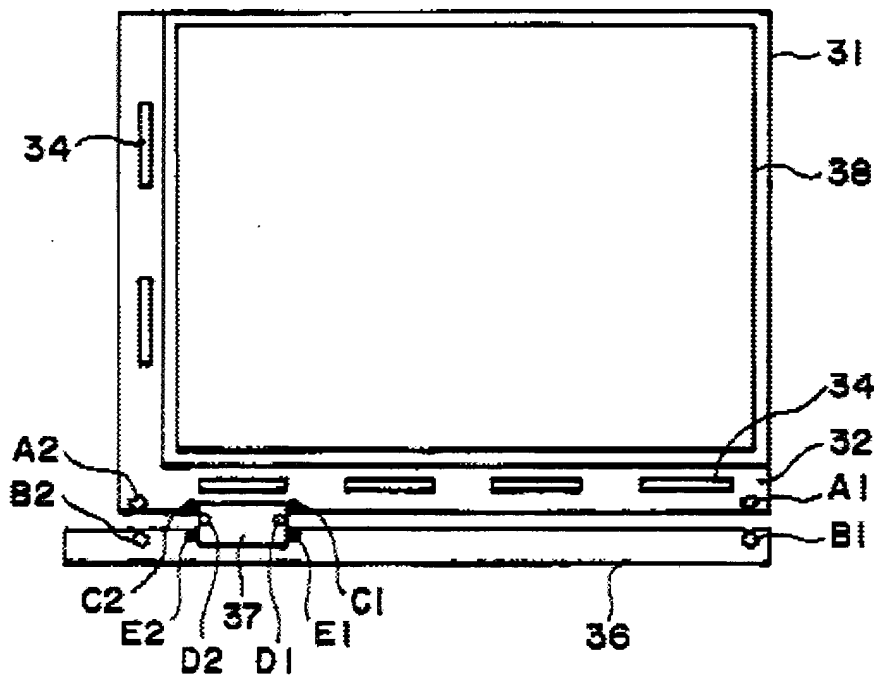


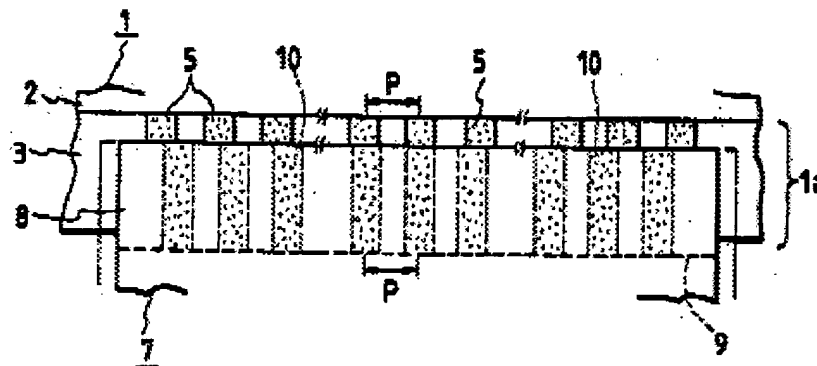
FIG. 6

Takahashi discloses the nature of the alignment problem, the dimensional change due to process heating, and decreasing the error by finely adjusting a size of a mask used in the electrode pattern formation (col. 1, lines 51-67, and col. 2, lines 1-48, especially col. 2, lines 29-39) so the pitches become substantially equal to each other during the bonding process (dimensional error reduced to acceptable magnitude which results in substantially equal pitch).

Takahashi does not explicitly disclose the mount base member having a linear thermal expansion coefficient that is larger than a linear thermal expansion coefficient of the substrate.

Ishikawa teaches the use of a flexible circuit board (Applicant's mount base member) with pitch $p=P/(1+\alpha)$ having a linear thermal expansion coefficient that is larger than a linear thermal expansion coefficient of the glass substrate by an amount related to α (Abstract, and Col. 4, lines 11-41) to ensure electrode terminals of the flexible circuit board and terminals of the glass substrate are connected to each other in a fully registered condition (Applicant's directly connects the first terminal bank and the second terminal bank, both of which become substantially equal to each other in pitch), and wherein the spacing of the alignment marks on the mount base member would necessarily be space more apart due to the linear thermal expansion coefficient that is larger than a linear thermal expansion coefficient of the glass substrate.

FIG. 1



Ishikawa is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add the use of a mount base member with pitch $p=P/(1+\alpha)$ having a linear thermal expansion coefficient that is larger than a linear thermal expansion coefficient of the glass substrate by an amount related to α to ensure the method directly connects the first terminal bank and the second terminal bank, both of which become substantially equal to each other in pitch.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the method of Takahashi with the use of a mount base member with pitch $p=P/(1+\alpha)$ having a linear thermal expansion coefficient that is larger than a linear thermal expansion coefficient of the glass substrate by an amount related to α to ensure the method directly connects the first terminal bank and the second terminal bank, both of which become substantially equal to each other in pitch, thereby making obvious the claimed method comprising: a first step of aligning the substrate with the mount base member so that a plurality of first

alignment marks, which are formed on the surface of the substrate and arranged to be opposed to each other with a first terminal bank interposed therebetween, is aligned with a plurality of second alignment marks, which are formed on the surface of the mount base member and arranged to be opposed to each other with a second terminal bank interposed therebetween, the first terminal bank being formed on the surface of the substrate, the second terminal bank being formed on the surface of the mount base member at a pitch which is smaller than a pitch of the first terminal bank, the plurality of second alignment marks being arranged at a spacing approximately equal to a spacing of the plurality of first alignment marks; and

a second step of connecting the first terminal bank to the second terminal bank with thermal compression bonding, the mount base member having a linear thermal expansion coefficient that is larger than a linear thermal expansion coefficient of the substrate;

wherein the connection step directly connects the first terminal bank and the second terminal bank, both of which become substantially equal to each other in pitch when the substrate and the mount base member are deformed during the thermal compression bonding of the substrate and the mount base member, and wherein during the connection step, the plurality of second alignment marks become spaced mutually more apart than the spacing of the first alignment marks.

As to claims 14, 17, and 23-25, Takahashi in view of Ishikawa teaches all the patentably distinct structure as claimed.

Ishikawa is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add the use of a mount base member with pitch $p=P/(1+\alpha)$ having a linear thermal expansion coefficient that is larger than a linear thermal expansion coefficient of the glass substrate by an amount related to α to ensure the method directly connects the first terminal bank and the second terminal bank, both of which become substantially equal to each other in pitch.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the method of Takahashi with the use of a mount base member with pitch $p=P/(1+\alpha)$ having a linear thermal expansion coefficient that is larger than a linear thermal expansion coefficient of the glass substrate by an amount related to α to ensure the method directly connects the first terminal bank and the second terminal bank, both of which become substantially equal to each other in pitch, thereby making obvious the claimed method comprising:

- an electro-optical panel including a substrate holding an electro-optical material;
- a mount base member thermal-bonded to the substrate, said mount base member having a linear thermal expansion coefficient that is larger than a linear thermal expansion coefficient of the substrate;
- a first terminal bank formed on the surface of the substrate;
- a plurality of first alignment marks formed and mutually spaced apart on the surface of the substrate;
- a second terminal bank formed on the mount base member, wherein the second terminal bank is directly connected to the first terminal bank, a pitch of

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the second terminal bank being substantially equal to a pitch of the first terminal bank; and a plurality of second alignment marks formed on the surface of the mount base member, and spaced mutually more apart than the spacing of the first alignment marks, wherein one group of the plurality of first alignment marks and another group of the plurality of first alignment marks are arranged to be opposed to each other with the first terminal bank interposed therebetween, and wherein one group of the plurality of second alignment marks and another group of the plurality of second alignment marks are arranged to be opposed to each other with the second terminal bank interposed therebetween.

As to claims 3, 10, and 16, Takahashi discloses the use of anisotropic conductive adhesive (col. 1, lines 51-55) and heating (col. 2, lines 29-34).

As to claims 5, 6, and 20-21, Takahashi discloses the use of polyimide film with a thickness of 15-75 μm (col. 5, lines 11-19) which overlaps the claimed range.

Takahashi discloses the dimensional error due to process heating to be generally between 0.05% and 0.1% (col. 2, lines 35-39) which would necessitate a corresponding pitch reduction range that compares to the claimed range. The expansion coefficient range would be inherent to the film material, would vary accordingly, and would affect the thermal expansion and in turn the selected pitch compensation.

As to claims 7, 8, and 18-19, Takahashi discloses the use of glass (col. 1, lines 51-53) and polyimide as an example material (col. 5, lines 15-19). Substitution of similar materials is not considered patentably distinct unless unexpected results are obtained. Therefore it would have been obvious to those having ordinary skill in the art of liquid crystals to use any of a range of similar materials as art recognized species of the claimed invention suitable for an intended purpose (MPEP 2144.07).

As to claim 22, Takahashi discloses the use of an electro-optical device in a motion picture image display (col. 9, lines 56-59), which is an electronic equipment.

Response to Arguments

3. Applicant's arguments filed on 07 July 2003 have been fully considered but they are not persuasive.

Applicant's ONLY arguments are as follows:

- (1) Prior art does not teach superimposed alignment marks.
- (2) There is no suggestion that the second alignment marks are to be spaced mutually more apart than the spacing of the first alignment marks.

Examiner's responses to Applicant's ONLY arguments are as follows:

- (1) It is respectfully pointed out that "superimposed" is not defined or supported in the specification. Prior art clearly teaches alignment marks aligned with opposed alignment marks as originally claimed and as supported in the specification.

(2) It is respectfully pointed out that the alignment marks as taught by the prior art are initially spaced equally apart, and the prior art teaches that the second member will thermally expand more than first member which will necessarily result in the claimed second alignment marks being spaced mutually more apart than the spacing of the first alignment marks, per rejections above. The alignment marks will move farther apart on the second member for the same reason of physics as the spacing of the second terminal bank increases, i.e., thermal expansion.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L Rude whose telephone number is (703) 305-0418. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.

Timothy L Rude
Examiner
Art Unit 2871

TLR
September 12, 2003


TOANTON
PRIMARY EXAMINER